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REMARKS

Claims 1-7 remain in the above-captioned United States Patent Application.
Claims 1-7 stand rejected.

Applicants appreciate the Examiner acknowledging that the amendments to page 8 of the Specification submitted in the Response to the Office Action, dated October 25, 2007, correct the problem noted by the Examiner in that Office Action.

Applicants appreciate the Examiner acknowledging that the amendments made in response to the telephone interview with the Examiner on December 12, 2007, (Summary mailed December 14, 2007), remove the rejection of the claims under 35 U.S.C. §112 discussed in the interview. Applicants understand that the Examiner has entered the claim amendments in the "PROPOSED CLAIM AMENDMENTS" submitted in response to the telephone interview of December 4, 2007.

The Examiner has, however, now pointed to certain "flaws in the wording" of the claim amendments, specifically referring to the language "wherein the pretreatment is prior to use of the multi-layered dielectric reflectivity coated substrate in one or more applications that expose the coating to optical fluence." The Examiner has proposed an amendment to this language to read "wherein the pretreatment is prior to the use of the multi-layered dielectric reflectivity coated substrate in an optical system, where one or more applications that expose the coating to DUV optical fluence occur."

Applicants have made this amendment to the language of Claim 1, and thus, remove any perceived lack of written description, overly broad scope and/or ambiguity to which the Examiner has referred.

The Examiner has referred to the use of "trademarks," specifically referencing "ARO OPuS" and "ARO" on page 4, lines 9-12 and 29; page 5, lines 5 and 23; page 6, lines 1-5; page 7, lines 8-14, page 8, lines 11-15, 19 and 24, and requires such "trademarks" to be indicated by all capitals and generic terminology used when referencing such "trademarks."

Applicants respectfully disagree that these references are to "trademarks."

Page 1 of the above-captioned Patent Application makes reference to an "optical pulse stretching unit," internally referred to by Applicants' assignee and abbreviated as an "OPuS" (p. 1, line 20), such as are sold by Applicants' assignee as part of high power

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excimer gas discharge laser systems, such as an XLA-100™ laser system (p. 1, lines 20-21), well known in the art for use at around 193 nm for laser light sources utilized in integrated circuit photolithography manufacturing processes. These OPuS's are referenced as an example of a case where "highly reflective [coatings are used] in applications where there is a probability of exposure to high optical fluence and over long periods of time." (p. 1, lines 18-19). Therefore, references to an "OPuS" or an "OPuS mirror" throughout the Specification does not use "OPuS" as a trademark, but rather refers back to p. 1, and is an abbreviation utilized in the Specification in discussing an optical pulse stretching unit or a mirror used in an optical pulse stretching unit.

ARO is mentioned as a company that sells mirrors coated with dielectric reflectivity coatings (p. 4, line 12). Corning is also mentioned as such a manufacturer. (p. 1, lines 26-27).

Applicants therefore respectfully request the Examiner to withdraw the objection to the use of trademarks to identify materials that are within the scope of the claimed subject matter.

Claims 1-7 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, and for adding new matter to the claim with respect to the "removal of water" from the dielectric materials "other than those disclosed", again based on the fact that the dielectric materials are only identified "via Trademarks." The Examiner has noted that "what scope is covered [by the claims] cannot be determined by the Examiner due to the lack of any indication of what materials are employed, other than identification by tradenames or the like."

Applicants assert, as they essentially have in the past, that there are only a certain number of materials that may be utilized as multi-layered reflectivity coatings in the DUV range, and more specifically for light at around 193 nm, which is produced by ArF gas discharge lasers and are well known in the art. Such materials are either well known in the art, or can be determined by one skilled in the art, without undue experimentation by contacting reflectivity/anti-reflectivity coating manufactures, such as Corning or ARO, whose materials, as noted in the Specification of the above-captioned Patent Application, Applicants' obtained and tested.

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Further, the claimed subject matter is limited to such materials that are subject to compaction upon exposure to high fluence DUV, such as from an ArF excimer gas discharge laser systems. Those skilled in the art can also easily determine, without undue experimentation, whether or not a material suitable for use as a reflectivity/anti-reflectivity coating for the approximately 193nm light is susceptible to compaction, and thus, susceptible to the method of the claimed subject matter to remove or lessen the effects of such compaction due to subsequent high fluence exposure in such laser systems.

Also, the original Specification as filed, provides support for the recited "removal of water." The Specification of the above-captioned application notes at least the following in regard to water desorption and its relationship to the claimed subject matter:

Applicants believe that the exposure to indirect UV light removes water from the thin dielectric films on the mirror substrate, and after the OH⁻ is removed from the film material the basic structure remains the same. The shift of the spectrum back to the original center wavelength after exposure to room air, indicates that the moisture or other contaminants present in air is able to get back into the film materials, due to lack of significant compaction. The lack of compaction for indirectly exposed dielectric material, either high density or low density appears also to relate to the exposure being in a purged environment, e.g., in N₂.

The above results have led applicants to conclude that a solution to the above described problems with such mirrors exposed to such fluence over long periods is to expose the mirror to direct DUV light for a relatively short number of pulses, compared to full life, e.g., for 2b pulses at, e.g., a 9mJ/pulse energy. For roughly double that pulse energy the exposure can be lower, e.g., about 700 Mp, i.e., at, e.g., 3KHz, exposure for several days to the DUV fluence. This can be done, e.g., prior to ever placing the mirror into its intended optical system, e.g., an OpuS on a laser system. This can be utilized to induce a pretreatment limited compaction and water vapor (and/or other contaminant) desorption.

Thereafter, the mirrors can be placed in a normal high fluence purged gas environment and significant blue shifting of the spectrum of the mirror can be

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essentially eliminated over the life of the mirror for, e.g., ten to twenty Bp or more. (p. 9, lines 3-23).

The Examiner is respectfully requested to withdraw the rejection of claims 1-7 under 35 U.S.C. §112, first paragraph, for failure to comply with the written description requirement, since trademarks have not been used to identify the materials that come within the scope of the claims, and the above constitutes adequate disclosure of the "removal of water" recitations in claim 1.

Claims 1-7 have been objected to under 35 U.S.C. §132(a) as having had introduced into them new matter in the Amendment filed on August 8, 2007. The Examiner notes that the material added at the time to the Specification is unsupported elsewhere in the Specification, and refers to figures that do not exist.

The paragraph has been again amended to refer only to FIG. 6. In addition, Applicants submit HD meaning "High Density" and LD meaning "Low Density" is amply supported in the discussions on the preceding pages referring to FIGs. 2-5 and the Figures themselves, which clearly refer to High Density and Low Density.

The Examiner is respectfully requested to withdraw the rejection of claims 1-7 under 35 U.S.C. §132(a) and allow claims 1-7.

Claims 1-7 have been rejected under 35 U.S.C. §112, first paragraph, as not being enabled. Once again, the Examiner has referred to the use of trademarks, which has been addressed above. In addition, the Specification is enabling, by identifying the materials that come within the scope of the claimed subject matter to one of ordinary skill in the art, without the need for the person of ordinary skill in the art to conduct undue experimentation, as discussed above. Identification of a coating material(s) for the specific wavelengths involved, and that might be utilized in the high fluence environments to which the claimed subject matter relates, is easily within the grasp of one of ordinary skill in the art, without undue experimentation. Whether that material is subject to such damage as compaction, and so subject to possibly obtaining the benefits of the claimed subject matter, is also knowledge achievable without undue experimentation.

In terms of one skilled in the art being able to understand the scope of the claims, it is not needed to know all possible coating material that might be within the scope of the

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claims. The claims are not directed to the materials themselves, but to a process for eliminating or alleviating a specific type of fluence induced damage by specific process steps. If the coating material is not subject to the type of damage to which the claimed subject matter refers, then there is no need to perform the process steps of the claimed subject matter. Neither does such performance of the recited steps infringe without being done as a pretreatment to utilization in high fluence DUV light. Whether or not the person of ordinary skill in the art has a list of possible coating materials does not impact knowing what constitutes infringement of the claim. Without such a list, the claims are quite clear as to what material(s) is covered by the claimed subject matter, and what process steps must be done to such material as a pretreatment to utilization of the material in a particular application. All of these elements of infringement of the claim are easily determinable without the possession beforehand of a list of applicable and/or non-applicable coating materials.

Applicants submit, therefore, that there is no requirement for Applicants to submit a list of materials that when so irradiated with suffer compaction, such that being processed with the process of the claimed subject matter, the detrimental effects of such exposure will be eliminated or at least reduced for subsequent use in an optical system further exposed to such fluence. Neither is there a requirement to identify all possible coating reflectivity materials, specifically limited to DUV light under 300 nanometers in wavelength, such as produced by an ArF excimer DUV light source, that will not suffer such compaction or like damage that may be inhibited using the process of the claimed subject matter.

Applicants further submit that the product data sheets for the specific coating that were tested by Applicants are the confidential information of the suppliers. However, any prospective customer of such supplier, for example, Corning or ARO, can obtain such information from those, or like vendors.

The Examiner has asserted that there is no way to search the claimed subject matter without the knowledge of at least one coating material that comes within the subject matter of the claims. Applicants submit that this is not the case. The claims are not directed to the composition of the material(s), but rather a process for treating coating materials used for reflectivity/anti-reflectivity coatings in high fluence laser light source

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(or the like) arts, where compaction at high fluences is an issue. Applicants submit that this is searchable to the same degree if as if the Examiner was presented with one exemplary material or with none. The only difference in the former is that, out of all the possible candidates for suffering compaction, or the like damage, or not suffering such damage, in the former case the Examiner has one specific example, and in the latter case none, but just as likely a longer list of materials could be applicable to the subject matter claimed. It is the process that is the subject matter of the claims and eminently searchable, not the composition of the materials themselves that may benefit from the process of the claimed subject matter.

The Examiner has herself found some candidate materials in JP04-228560 and Ruffner (specifically identifying compaction as an issue in lenses made using CaF_2 and subjected to high fluence 193 nm ArF laser light). In neither case has the Examiner asserted that the process of the claimed subject matter is disclosed, suggested or utilized in either of those two references.

The Examiner is respectfully requested to withdraw the rejection of claims 1-7, as not being enabled, and allow claims 1-7.

Claims 1-7 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite, and specifically ambiguous. Claim 1 has been amended to correct this concern of the Examiner. The Examiner is therefore respectfully requested to withdraw the rejection of claims 1-7 under 35 U.S.C. §112, second paragraph as being indefinite and allow claims 1-7.

Claims 1-7 have been rejected under 35 U.S.C. §112, first paragraph as not being enabled, since the Specification does not "provide enablement for pretreatment with respect to all possible optical fluences, or for completely unspecified application of such optical fluences."

Claim 1 has been amended to correct this concern of the Examiner. The Examiner is respectfully requested to withdraw the rejection of claims 1-7 under 35 U.S.C. §112, first paragraph for lack of enablement and allow claims 1-7.

Claim 1 has been amended, as discussed above, in response to the Examiner's comments in Sections 1 and 5. The Examiner is therefore, respectfully requested to

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withdraw the rejection of claims 1-7 under 35 U.S.C. §112, first paragraph for failure to comply with the written description requirement.

Claim 1 has been rejected under 35 U.S.C. §102 (b) as anticipated by, or in the alternative, made obvious by, United States Patent No. 5,911,858, entitled METHOD FOR HIGH-PRECISION MULTI-LAYERED THIN FILM DEPOSITION FOR DEEP AND EXTREME ULTRAVIOLET MIRRORS, issued to Ruffner on June 15, 1999 ("Ruffner"). The Examiner has referenced the rejection made in the Office Action dated October 25, 2007, and the comments in Sections 1 and 5 of the present application, i.e., the ambiguity/scope of the claims (section 1) and the indefiniteness of the claims.

Applicants have amended claim 1, as noted above, with respect to Section 1, in the manner suggested by the Examiner, and additionally to address the Examiner's concerns expressed in Section 5. As such, the process of the claimed subject matter is not anticipated by, or suggested by or obvious from Ruffner.

The Examiner is respectfully requested to withdraw the rejection of claim 1 under 35 U.S.C. §102 (b) and under 35 U.S.C. §103(a) and allow claim 1.

Claims 2 and 4 have been rejected under 35 U.S.C. §103(a) over Ruffner as set forth in Section 7 of the Office Action dated October 25, 2007. The Examiner has suggested an amendment to remove this rejection. Applicants have amended claim 1 in response to the Examiner's comments in Section 1 of the present Office Action, which should remove this rejection based on Ruffner.

The Examiner is respectfully requested to withdraw the rejection of claims 2 and 4 under 35 U.S.C. §103(a) and allow claims 2 and 4.

Claims 1-4 have been rejected under 35 U.S.C. §102(b) as anticipated by, or alternatively, under 35 U.S.C. §103(a) as unpatentable over, United States Published Patent Application No. 20020001672, entitled PROTECTIVE OVERCOAT FOR REPLICATED DIFFRACTION GRATINGS, with named inventors Pan, et al., published on January 3, 2002 ("Pan"), as set forth in Section 9 of the Office Action dated October 25, 2007.

With respect to claims 3 and 4, the Examiner has indicated, as with claims 2 and 4, that the amendments made responding to the Examiner's comments in Section 1, remove this rejection of claims 3 and 4.

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Regarding claims 1 and 2, Applicants understand that the treatment of the claims 1-4, together in the rejection of Section 9 of the October 25, 2007, Office Action, indicates that the current amendments to claim 1 should also address rejection of claims 1 and 2 under 35 U.S.C. §102 (a) or 35 U.S.C. §103 (a).

The Examiner is respectfully requested to withdraw the rejection of claims 1-4 under 35 U.S.C. §102 (a) or 35 U.S.C. §103 (a) and allow claims 1-4.

Claims 1 and 5-7 have been rejected under 35 U.S.C. §103(a) as unpatentable over United States Patent No. 6,180,188, entitled METHOD FOR PREPARING A MULTILAYER OPTICAL MATERIAL WITH CROSSLINKING-DENSIFYING BY ULTRAVIOLET RADIATION, issued to Belleville, et al. on January 30, 2001 ("Bellville I") or United States Patent No. 6,387,517, entitled INORGANIC POLYMER MATERIAL WITH TANTALIC ACID ANHYDRIDE BASE, IN PARTICULAR WITH HIGH REFRACTIVE INDEX, MECHANICALLY ABRASION PROOF, METHOD OF MANUFACTURE, OPTICAL MATERIALS COMPRISING SUCH MATERIAL, issued to Belleville, et al. on May 14, 2002 ("Bellville II").

The Examiner has taken the position that the claimed subject matter of the above-captioned Patent Application differs from Bellville, only in requiring "use of a laser to effect the compaction."

The claims as currently amended clearly define a process not taught or suggested by Bellville I or Bellville II, involving a pretreatment followed by a subsequent use in a high DUV fluence produced by a high powered laser. Bellville teaches, at best, the creation of an optical coating by depositing layers of material on a substrate and cross-linking them with DUV light at room temperature as a replacement for more complex and expensive thin film deposition techniques such as chemical vapor deposition. (Bellville I, Col. 7, lines 1-31, Col. 14, lines 57-67). There is no teaching nor suggestion in Bellville I or Bellville II, to use compaction engendered by exposure to DUV light as a pretreatment to enhance the optical performance during subsequent exposure to high DUV fluence. Indeed, Bellville I and Bellville II, simply use DUV to improve the mechanical, rather than optical, properties of the deposited layers. (The optical properties come from the makeup, arrangement and thicknesses of the layers). There is no teaching or suggestion of using the processes of Bellville I or Bellville II, for reflectivity coatings operative in

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the DUV range (Bellville I and Bellville II relate to coatings effective from 400 to 550 nm in wavelength). (Bellville I, Col. 8, lines 66-67).

The Examiner has also taken the position that, with respect to Bellville I or Bellville II, exposure to DUV lamp light as taught by Bellville I or Bellville II can cause maximum densification such that no more densification can occur and this is the same as the claimed:

sufficient compaction or densification by removal of water vapor in enough of the multi-layered dielectric reflectivity coating to inhibit subsequent compaction or densification during continued exposure to DUV or shorter wavelength radiation

Even if this were true, however, this would not be the claimed "pretreatment" as such a maximum densification or compaction would prohibit the subsequent use of the optical system in an application where further exposure to DUV light occurs. That is, such a "maximum densification" which the Examiner seems to believe is inherent in the disclosure of Bellville I or Bellville II, would not allow the claimed optical system to be utilized in an:

application[] that expose[s] the coating to high DUV optical fluence, produced by a high powered laser DUV light source of 300 nanometers in wavelength or less, occur

as is the subject matter of claim 1.

Similarly, as to the comments of the Examiner regarding the disclosure in Bellville I and/or Bellville II, regarding removal of water or effects on index of refraction due to densification, the references do not teach or suggest the utilization of such an exposure to high fluence as a pretreatment according to the subject matter of the claims.

The Examiner is respectfully requested to withdraw the rejection of claims 1 and 5-7 under 35 U.S.C. §103(a) and allow claims 1 and 5-7.

The Examiner has taken the position in response to arguments previously submitted by Applicants, that the Examiner cannot determine what materials are covered by the claims. Applicants reiterate that this is not the case. The claims, specifically, independent claim 1, cover a process for treating materials used in making reflectivity coatings "multi-layered dielectric reflectivity coatings" that are subject to certain damage,

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such as compaction due to exposure to high fluence DUV light. The process involves subjecting such a material to a "pretreatment" prior to the coating (and its substrate) being subsequently utilized in a "optical system" that is exposed to "high DUV optical fluence, produced by a high powered laser DUV light source of 300 nanometers in wavelength or less"

As noted above, Applicants submit that the scope of this claimed subject matter is entirely clear, and unambiguous, and fully supported (described and enabled), in the Specification. The Examiner's view that the scope is only defined through the use of Trademarks or tradenames has been shown to be incorrect.

The Examiner has noted that the claims do not require the coatings at issue to be subject to compaction or like damage nor to be used in with DUV light in the subsequent application exposed to light fluence.

The claims call for the material to be subject to compaction/densification under DUV light of 300 nm or less wavelength. The pretreatment exposes the material to such light to cause compaction/densification. In addition, the claims have been further amended to recite that the subsequent use is in a high fluence DUV light produced by a high powered laser.

The claims, therefore, are clear and unambiguous and define over the cited art, particularly including Bellville I and Bellville II. The Examiner has taken the position that Bellville I and Bellville II are applicable to the claims, because the claims are so broad in scope as to read on Bellville I and Bellville II. Applicants submit that, to the extent this position is based on the description relying on trademarks, this position is incorrect. In addition, the claims clearly define a process not taught or suggested by Bellville I or Bellville II involving a pretreatment followed by a subsequent use in a high DUV fluence produced by a high powered laser.

The Examiner is respectfully requested to reconsider Applicants' arguments, including in light of the modifications to the amendments to the claims as suggested by the Examiner.

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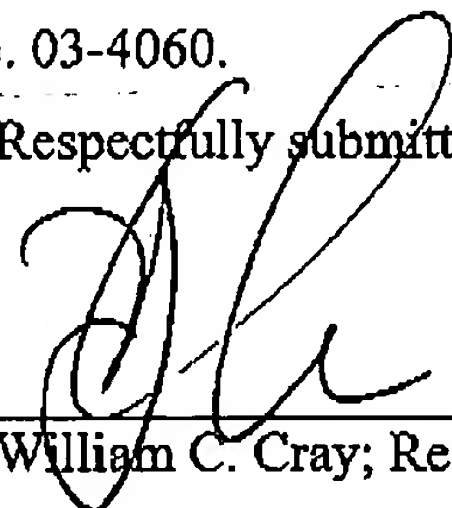
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CONCLUSION

For the above-stated reasons, the Examiner's rejections of and objection to claims 1-7, have been shown to be incorrect. Applicants have amended the claims and otherwise shown that the Examiner's rejections and objections to claims 1-7 are improper. The Examiner is, therefore, respectfully requested to withdraw the rejections and objections to claims 1-7, as discussed above, and allow claims 1-7.

Applicants do not believe that any fees or charges are due in the above-captioned application for its continued prosecution, however, in the event that any such fees or charges are due and owing, then the Commissioner is hereby authorized to charge any such additional fees or charges to the Deposit Account of the assignee of the present application, Cymer Inc., Deposit Account No. 03-4060.

Respectfully submitted,



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June 3, 2008
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